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of the CO_2 by the parts containing chlorophyll. He distinguishes two periods in the vegetative season of the plant:— the first period, when nitrogenous constituents predominate, is that during which vegetation is most active; the second, when the proportion of carbonaceous substance is relatively larger, is the period when respiration is comparatively feeble, the CO_2 evolved being again almost entirely taken up by the chlorophyll, decomposed, and the carbon fixed in the process of assimilation or digestion. He found that the proportion of nitrogenous matter in leaves gradually diminishes, while that of carbonaceous matter increases, between autumn and spring. — A. W. B.

MARTENIA PROBOSCIDES.—This is a very common plant in Arizona and is very productive. Its large seed pods after being deprived of their epidermis are used by all the Indian tribes of Arizona to ornament their willow baskets. The method resorted to is first to soften by means of water the black pods which are very hard. They readily soften, and are then straightened, split into the requisite strips and worked into willow baskets to form the black ornamentations seen in those made by all the tribes of Arizona.—EDWARD PALMER.

ZOOLOGY.

AN ADDITIONAL CHARACTER FOR THE DEFINITION OF RHYNCHOPHOROUS COLEOPTERA.¹—On two former occasions I have invited the attention of my colleagues of the Academy to the relations which the Rhynchophorous Coleoptera bear to the other divisions of that order of insects. In the first of these I endeavored to show that they formed a group which was equivalent to all the others combined. The defining character of the group I stated to be, that the posterior lateral elements (the prothoracic epimera), of the under surface of the prothorax, coalesced on the median line, in such a manner as to form a longitudinal suture behind the end of the prosternum; in all other Coleoptera² the prosternum ends in a vacant space, or extends so as to take part in the articulation between the pro- and metathoracic segments. In the second memoir I attempted a sketch of the manner in which the group might be naturally divided into series and families.

¹ Read before the National Academy of Sciences, at Philadelphia, Nov. 5, 1874.

² Except in *Cossyphus* and a few *Colydiidæ*.

During the progress of the investigations which will terminate in the classification, according to the scheme there proposed, of the genera and species by which the Rhynchophora are represented in our fauna, I have been led to observe an additional character serving to define this great and important complex of genera. This character strengthens greatly the opinion I first announced concerning its systematic value, as an equal of all the other Coleoptera combined.

On separating the head of a Rhynchophore, it is seen that the cranium (I use this word for want of a better term) is globose, and always presents a distinct trace of a median suture on the under surface, corresponding with the gular sutures of other Coleoptera. In the latter, however, these sutures diverge either before or behind, and rarely (Silphidæ and Staphylinidæ), approximate at the middle of their course. Whether the differences in direction of these sutures may or may not, when carefully studied, give indications for the definition of the series into which the normal Coleoptera are now divided upon other characters, I cannot now say. But this much I can assert positively, that in no other but the Rhynchophora, do the lateral elements of the under surface of the head coalesce on the median line, so as to form a straight longitudinal suture extending to the posterior limit of the chitinous part of the head.

In most of the Coleoptera the gular sutures diverge behind, and even when they are obsolete, their posterior termination is indicated by a nick or irregularity in the outline of the infero-posterior margin of the cranium. In the Ptinidæ and Bostrichidæ, by a remarkable exception, the sutures, though distant in front, converge behind.

It will not be in my power, for some time to come, to follow this train of investigation to its limits, and I now make known these imperfect observations in the hope of inducing observers, who are less burdened with a great mass of material urgently pressing for classification, to give some attention to the valuable characters here indicated. — J. L. LeCONTE, M.D.

NOTE ON TELEA POLYPHEMUS.—My note on the synonymy of this species on page 753 of Vol. viii, of the AMERICAN NATURALIST, was printed without proof having been sent to me. In the second paragraph, line six, "this Bombycid" should read "the

Bombyces." No species of *Attaci* have yet been discovered in Cuba; the very extensive collections of Lepidoptera made in that Island by Professor Poey and Dr. Gundlach having been examined by me (see Grote, on the Bombycidae of Cuba, Proc. Am. Ent. Soc. Phil., 5). As stated, Linné has no species under the name *Polyphemus* in his 10th or 12th Editions, or in the Mus. Lud. Ulr., but I find that in the 13th Edition, p. 2402, No. 461, he cites a species under that name. Linné gives references to Fabricius and to Cramer and undoubtedly intends our species. He says: "*Habitat in America boreali, Jamaica.*" The preceding species is his *Paphia*, of which he says: "*Habitat in Asia,*" and there is no reference, doubtful or otherwise, to Catesby. So that I repeat my former conclusion that there can be no reasonable doubt that Linné's *Paphia* is a distinct species from our *Polyphemus*, and that we are not justified in surrendering the latter name. I have recently given the synonymy of the North American forms of the group (*Attaci*) to which *Polyphemus* belongs in the Transactions of the American Philosophical Society.—A. R. GROTE.

NOTES ON CALIFORNIAN THRUSHES.—The recent appearance of the excellent work by Baird, Brewer and Ridgway, on the "History of North American Birds," makes it necessary for me to explain some discrepancies between my statements in the "Ornithology of California" and the views taken by them in relation to the two common brown thrushes of California.

1. A reference to Baird's report, in Vol. IX, P.R.R. series, will show that the specimens collected on those expeditions led him to believe that *T. ustulatus* was limited to the "Coast region of Washington Territory and Oregon," while the *T. nanus* was confined to the "Pacific Slope, from Ft. Bridger and Ft. Crook (about lat. 41°) to the valley of the Gila and Cape St. Lucas.¹ In the Ornithology of California I merely extended the range of *ustulatus* to "San Francisco in winter," having observed it there (as I supposed) while in the Colorado valley, and at San Diego I only found *nanus* at that season. Relying too much on the authority of the Pacific Railroad Report, I assumed that *ustulatus* was a northern form only, and *nanus* a southern and consequently dwarfed race (without reference to their eastern allies). I may

¹ Townsend however obtained the type without doubt at Columbia River.

remark, that in the woods it is impossible to distinguish between them at the distance such shy birds usually keep from the observer.

2. At the time I wrote the Ornithology of California, I had collected only *nanus* in winter, and with the above mentioned impressions, too hastily concluded that they remained in the state all summer, while the *ustulatus* retired to more northern regions. Afterwards when collecting the nests and eggs assigned to *nanus*, it was inconvenient, and seemed unnecessary to preserve the birds also. I will admit therefore, that I may have described those of *ustulatus* as belonging to *nanus*.

3. That there is still reason to believe that *nanus* does not always build on the ground is shown by the note in Vol. III, Hist. N. A. Birds, p. 499, describing the nest of "var. *Audubonii*" on a tree, and in a region remarkable for dryness.²

4. The statement on page just quoted, that "Dr. Cooper has sent to the Smithsonian Institution skins of his *T. nanus* and they prove to be *T. ustulatus*," is not quite correct. I sent one skin from near San Buenaventura with notes showing its differences from *T. nanus* (which I also obtained there), and my uncertainty as to what to call it. Prof. Baird wrote that it was *T. ustulatus*, although I had supposed, from its very olivaceous hue, that it might be *Audubonii*. I had not considered it *nanus*, and it was so much less brown than the *ustulatus* I obtained in Washington Territory that I did not suppose it the same. It must be considered a link between them and the var. *Swainsonii*.

5. The facts now stand exactly in reverse of the range given in the Report on Birds in the Pacific Railroad Survey. Thus *ustulatus* is the *summer* species of California as well as northward, breeding from Alaska south to lat. 35°, near the coast and in low grounds. *Nanus* is the *winter* species of California, retiring north and perhaps to the high mountains in summer, while in winter it only reaches Cape St. Lucas, *ustulatus* going entirely south of the United States, and as far as Guatemala.

6. In southern Californian specimens there is not so marked a difference between the color of the tail and back in *ustulatus* and *nanus* as to distinguish them strongly without comparison, nor

² Audubon and Wilson also described the nest and eggs of var. *Swainsonii* much as I did those of var. *nanus*.

can I give any differences in song, unless I suppose that *nanus* is quite silent while with us, and that all my notes on songs belong only to *ustulatus*. They are easily distinguishable by measurements.

7. Admitting the determinations of the authors quoted, the law of priority requires us to call the species *T. ustulatus* and var. *Swainsonii*, also *T. nanus* and vars. *Pallasii* and *Audubonii*. It is however a question not decided by them, whether the two species of Peru are identical with those of North America. If found south of the equator, they must be supposed to migrate toward the south pole, if at all, and there may even be two or three races of each in South America, corresponding to longitudinal differences in climate. Though quoting Fauna Peruana they do not give localities for ours south of the equator. Do *T. minimus* Lafr. and *T. guttatus* Cab. cover the Peruvian species? or is any similar species found there?—J. G. COOPER.

ASCENDING PROCESS OF THE ASTRAGALUS IN BIRDS.¹—Mr. Morse first described the ascending process of the astragalus in birds, as seen in the hen. The astragalus in birds coössifies early with the end of the tibia, and this process, as it has been called, ascends as a spur from the upper side of the astragalus in front of the tibia. In certain extinct reptiles, like *Hypsilophodon*, *Lælaps*, and others, the ascending process of the astragalus shows itself as an avian character.

A few years ago Prof. Wyman discovered that this process had an independent centre of ossification, and therefore could not be a process of the bone. Mr. Morse had interpreted this bone as the intermedium of Gegenbaur. The intermedium is a tarsal bone, occupying a position between the astragalus and calcaneum. In the Saurians, turtles, and other reptiles this bone is well seen. In certain amphibians as in the salamanders, the bone is long, wedge-shaped, and partially projects between the tibia and fibula.

Mr. Morse has expressed his belief that the ascending process of the astragalus represented the intermedium of reptiles. He had published in the "Annals of the New York Lyceum of Natural History" a theoretic figure of the proper position of this bone in birds, comparing it with the intermedium of certain salamanders.

¹ Abstract of a paper read at the Hartford meeting of the American Association for the Advancement of Science, by Edward S. Morse.

He explained its position in front of the tibia as a supposed process of the astragalus, by calling attention to the excessive tendency to ankylosis in birds. The widening of the tibia to include all the tarsals within its width necessarily brings the intermedium in front of the tibia, and, as it early unites with the astragalus, has naturally been mistaken.

Mr. Morse had been able to confirm his opinion regarding the nature of this bone in studying the embryos of the common tern at Penikese Island. In the embryo bird the intermedium appeared as a long oval bone between the astragalus and calcaneum, passing up between the tibia and fibula as seen in the lower reptiles.

In this connection it is interesting to observe that in the mammalia the intermedium does not occur, and Gegenbaur has expressed the opinion that the astragalus of mammals represents the astragalus and intermedium united. These investigations might possibly go to confirm that opinion in the fact that in reptiles the intermedium is separate; in birds it is separate in the young bird, but connected with the astragalus in the adult state, while in mammals, if Gegenbaur be right, it is always so connected.

GEOLOGY.

RETURN OF PROFESSOR MARSH'S EXPEDITION.—Professor Marsh and party returned to New Haven, Dec. 12th, after an absence of two months in the West. The object of the present expedition was to examine a remarkable fossil locality, discovered during the past summer in the "Bad Lands" south of the Black Hills. The explorations were very successful, notwithstanding extremely cold weather, and the continued hostility of the Sioux Indians. The latter refused to allow the expedition to cross White River, but a reluctant consent was at last obtained. They afterward stopped the party on the way to the "Bad Lands," attempted a night attack on their camp, and otherwise molested them, but the accompanying escort of U. S. troops proved sufficient for protection. The fossil deposits explored were mainly of Miocene age, and although quite limited in extent, proved to be rich beyond expectation. Nearly two tons of fossil bones were collected, most of them rare specimens, and many unknown to science. Among the most interesting remains found were several species of gigantic *Brontotheridæ*, nearly as large as elephants. At one point these bones were